

We Claim:

1. A machine for forming a C-shaped link from a wire having corners in cross section for use in making a jewelry chain  
5 comprising:

means for feeding said wire in and along a V-shaped groove formed in a surface of a stationary die, said V-shaped groove adapted to accommodate a first corner of said wire;

means for cutting said wire to form a predetermined length  
10 of said wire in said V-shaped groove, said surface of said die having a concave forming surface between ends of said predetermined length of said wire;

said concave forming surface having a shape including a corner to correspond with the first corner of said wire in said  
15 V-shaped groove;

means comprising a smooth mandrel contacting a second corner of said wire on an opposite side of said wire from said first corner for pushing and bending said wire into said concave forming surface to form said wire into a U-shaped configuration;  
20 and

means comprising a pair of movable die sections for closing said wire to form a C-shaped link surrounding said smooth mandrel, said movable die sections having die V-shaped grooved surfaces shaped to correspond to said first corner of said wire,  
25 thereby forming a C-shaped link of said wire in which said second corner forms an inner circumference of said C-shaped link and

said first corner forms an outer circumference of said C-shaped link.

2. The machine of Claim 1 in which said wire is square in  
5 cross section so that said C-shaped link is diamond shaped.

3. The machine of Claim 1 in which said wire is a polygon in cross section so that said C-shaped link is diamond shaped with facets.

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4. Apparatus for removing a C-shaped link from a mandrel circular in cross section, said C-shaped link being bent around a smooth mandrel, comprising:

a mandrel housing having a hole in an end wall to receive  
15 one end of said smooth mandrel, said hole having a diameter large enough to receive a first end of said smooth mandrel and not large enough to accommodate said C-shaped link on said smooth mandrel;

a pin at right angles to a length of said smooth mandrel for  
20 contacting an end of said smooth mandrel within said hole when said smooth mandrel is inserted into said hole;

a spring within said hole contacting a side of said pin opposite to a side in contact with the first end of said smooth mandrel; and

25 an anvil for forcing the first end of said smooth mandrel against said pin compressing said spring causing the end wall of

said mandrel housing to pop said C-shaped link from away from said smooth mandrel, said spring at least partially ejecting said smooth mandrel from said hole when said anvil is retracted.

5       5. The apparatus of Claim 4 having a gripper mechanism to remove said C-shaped link from a second end of said smooth mandrel after said C-shaped link is removed from being bent against said smooth mandrel.

10      6. The apparatus of Claim 4 in which a length of said smooth mandrel is sufficiently short as to allow said C-shaped link when popped out away from said smooth mandrel to drop into a container for collecting the C-shaped link.

15      7. A method of making a jewelry chain from a plurality of C-shaped links formed from a wire having corners in cross section comprising the steps of:

20       feeding said wire in and along a V-shaped groove formed in a surface of a stationary die, said V-shaped groove adapted to accommodate a first corner of said wire;

          cutting said wire to form a discrete predetermined length of said wire in said V-shaped groove, said surface of said die having a concave forming surface between ends of said predetermined length of said wire, said concave forming surface 25 having a shape including a corner to correspond with the first corner of said wire in said V-shaped groove;

pushing and bending said wire into said concave forming surface using a smooth mandrel contacting a second corner of said wire on an opposite side of said wire from said first corner to form said wire into a U-shaped configuration;

5       closing said wire to form a C-shaped link surrounding said smooth mandrel using a pair of movable die sections, said movable die sections having die V-shaped grooved surfaces shaped to correspond to said first corner of said wire, thereby forming a C-shaped link of said wire in which said second corner forms an  
10 inner circumference of said C-shaped link and said first corner forms an outer circumference of said C-shaped link;

removing said C-shaped link from said smooth mandrel;  
moving successive segments along said V-shaped groove formed in said surface of said stationary die to produce a plurality of  
15 C-shaped links from the same wire; and  
combining said C-shaped links to form a jewelry chain.

8. The method of removing a C-shaped link from a smooth mandrel circular in cross section, said C-shaped link being in a  
20 groove surrounding said smooth mandrel, comprising the steps of:

inserting one end of said smooth mandrel into a hole in an end wall of a mandrel housing, said hole having a diameter large enough to receive said smooth mandrel and not large enough to accommodate said C-shaped link on said mandrel, a pin within said  
25 hole at right angles to a length of said smooth mandrel for contacting an end of said smooth mandrel within said hole when

said smooth mandrel is inserted into said hole, and a spring within said hole contacting a side of said pin opposite to a side in contact with said smooth mandrel;

using an anvil to push said smooth mandrel against said pin,  
5 compressing said spring and causing the end wall of said mandrel housing to pop said C-shaped link away from being bent around said smooth mandrel, said spring at least partially ejecting said smooth mandrel from said hole when said anvil is retracted; and

removing said C-shaped link from one end of said smooth  
10 mandrel.

9. The method of Claim 8 in which said C-shaped link is removed from said smooth mandrel by using a gripper to grab said C-shaped link and moving said C-shaped link past an end of said  
15 smooth mandrel.

10. The method of Claim 8 in which said C-shaped link is removed from said smooth mandrel by dropping off one end of said smooth mandrel when said C-shaped link is popped out away from  
20 said smooth mandrel.

11. A process forming a seamless C-shaped jewelry link made by a machine from square crossectional metal wire comprising the steps of:

25 providing a seamless metal wire having a square crossection, said wire having four straight longitudinally extending corner

edges extending along a predetermined length of said wire;  
said square wire being rotated onto a first corner edge of  
said four respective straight longitudinally extending corner  
edges and said rotated square wire being placed upon a smooth  
5 mandrel, wherein said first corner edge tangentially contacts  
said smooth mandrel;

10 said smooth mandrel contacting a portion of said first  
longitudinally extending corner edge of said square crossectional  
metal wire;

15 said machine further having a forming die, said forming die  
having a respective further groove holding therein a portion of a  
second opposite longitudinally extending edge of said square  
crossectional metal wire;

bending a section of said square crossectional metal wire  
15 over said smooth mandrel, to form a C-shaped jewelry link,

said formed C-shaped jewelry link being diamond shaped in  
cross section,

20 said C-shaped jewelry link having an outer circumference  
being widest at a respective widest width formed by an opposite  
pair of said four corner edges of C-shaped jewelry link.

12. The process of forming said jewelry link by a machine  
as in Claim 11 further comprising the step of removing said C-  
shaped jewelry link from between said forming die and said smooth  
25 mandrel;

moving successive segments along said respective grooves

formed in said forming die to produce a plurality of C-shaped jewelry links from square wire; and

combining said C-shaped links to form a jewelry chain.

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13. The method as in Claim 7, wherein, prior to feeding said wire, said wire is shaved to form at least one facet thereon.

10 14. The method as in Claim 13, wherein, prior to feeding said wire, said wire is shaved to form a plurality of facets thereon.

15 15. The process as in Claim 11, wherein, prior to rotating said wire onto one of its respective straight longitudinally extending edges, said wire is shaved to form at least one facet thereon.

20 16. The process as in Claim 15, wherein, prior to rotating said wire onto one of its respective straight longitudinally extending edges, said wire is shaved to form a plurality of facets thereon.

25 17. The process as in Claim 11 wherein further rotation of said link onto said longitudinally extending corner edge results in respective widest points of said C-shaped link correspond to a common hypotenuse joining two equilateral triangles, forming said

diamond crossectional width of said C-shaped link.

18. The process of forming said jewelry link as in Claim 11  
wherein said jewelry link is solid.

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19. The process of forming said jewelry link as in Claim 11  
wherein said jewelry link is hollow.